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MELANOPHILA GENTILIS LEC. AND MELANOPHILA CALIFORNICA VAN DYKE IN PONDEROSA AND JEFFREY PINE

A Review of Published and Unpublished Notes

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by
K. A. Salman & J. W. Bongberg
Berkeley, California
February 2, 1937

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Forest Insect Laboratory
Berkeley - California
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A Review of Published and Unpublished Notes

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MELANOPHILA GENTILIS LEC. AND MELANOPHILA CALIFORNICA VANDYKE IN PONDEROSA AND JEFFREY PINE

A Review of Published and Unpublished Notes

INTRODUCTION

Very little is known of the role played by M. gentilis Lec. and M. californica VanDyke in infestations of ponderosa and Jeffrey pine in California. Field men know the two species as flathead borers. They make no distinction between infestations by either species. Forest entomologists are undecided as to which species is responsible for infestations in standing trees, felled trees, logging slash, or windfalls.

It has been determined that the western pine beetle (Dendroctonus brevicomis Lec.) is predominantly the most abundant species recorded from infested ponderosa pine trees. That species often does not seem to be the primary entomological cause of death of the infested trees. The same thing may be said of the Jeffrey pine beetle (Dendroctonus jeffreyi Hopk.) in Jeffrey pine. In recent years, flathead borer infestations have been recognized as important elements in the infestation of both host species. In many of the trees that have been examined, flathead borers seem to have played a primary role in the succession of attacks of the several species of insects that have been involved in the death of those trees.

There is a definite need for information concerning Melanophila infestations in ponderosa and Jeffrey pines. It is necessary that we know which species attacks each of the several different types of host materials that are infested by flathead borers. The habits of attack of each species also should be known.

Answers to the questions that have been raised concerning flathead borer infestations have been sought in published notes. Unpublished notes and the many collection and rearing records in the files of the Berkeley Laboratory have been analyzed in order to secure a basis for appraising the role of each species. During the past three years, samples of infested bark have been collected from different portions of infested trees and from different types of infested material. Adults emerging from those samples have been determined. Those determinations, in conjunction with stem analyses of the composition of infestation in the trees from which the samples were taken, have made it possible to secure at least a partial answer to the questions that have been raised concerning the two species of Melanophila.

TAXONOMY

Both species belong to the Subfamily Buprestini, Family Buprestidae and the Order Coleoptera. (Leng, 1920)[1]. According to Sloop (1935) both species belong to Obenberger's group Phaenops. Sloop considers that group a

1. Figures in parentheses refer to the papers listed at the end of this report.

subgenus, separating it from Melanophila (Melanophila) by the absence of sensory pits contiguous to the lateral margins of the middle coxal cavities.

Adults:

Although considerable variation exists, accurate field identification of most specimens of the two species can be made on the basis of color differences.

Leconte (1863, p.42) described the adult of M. gentilis. That species is the larger of the two. It is a bright blue-green color. The elytra are immaculate. The antennae extend beyond the hind angles of the prothorax. The third segment of the antenna is almost as long as the first and second taken together. The pronotum is widest in front of the middle.

VanDyke (1918, p.54) described the adult of M. californica from a large series of specimens. That species is dark, usually being of a bronze color. Usually the elytra are maculate, three yellow spots being present on each elytron. Sometimes definite maculations are not visible. Antennae extend to the hind angles of the pronotum. The third antennal segment is about twice as long as the second and is distinctly longer than the third. The pronotum is widest at the base.

Larvae:

Burke (1917) developed a key that separates the larvae of Melanophila from those of other Buprestid genera. So far as is known, no key to the larval stages of species of Melanophila has ever been published. DeLeon (1935) tentatively separated the larvae of gentilis and californica as follows:

> "Groove dividing ventral plate (prothorax) extending to anterior margin; roughenings of dorsal (prothoracic) plate unevenly spaced; labrum broad, usually emarginate . . . gentilis."
>
> "Groove of ventral plate not extending to anterior margin; roughenings or dorsal plate rather evenly spaced; labrum narrow, usually evenly rounded . . . . . californica."

PUBLISHED BIOLOGICAL NOTES

Brief references to the biology of either or both species are to be found in the literature. For the most part they add little to the notes published by Burke (1919).

Burke considered that most flathead borers have but one generation a year although some individuals, even of the same brood, may require a longer period of time to complete their development. He considered that M. gentilis is very injurious to second growth timber but also attacks and kills mature trees. He stated that the species is one of the most injurious enemies of its host species. It was his opinion that M. californica is of

equal importance in second growth timber. However, its role in the infestation of mature trees was considered to be chiefly that of supplementing the effects of primary attacks by barkbeetles.

Keen (1929) thought that gentilis is responsible for the death of many pines, particularly in the Sierra region. More recently (1934) he has emphasized the importance of that species in stands on rocky slopes and in other situations where the soil moisture is insufficient for normal tree growth. M. californica he considers to be very destructive to pine stands growing in northeastern California and in southwestern Oregon.

UNPUBLISHED BIOLOGICAL NOTES

107 collection or rearing records are available for study. 89 of those pertain to attraction or infestation of ponderosa pine. 18 pertain to attraction or infestation of Jeffrey pine. The records considered in this report do not include those taken as a part of the flathead biological project which was included in the station program during 1936.

It is extremely difficult to classify all the records. Some note attraction to foliage, slash or felled trees. Other record infestation of felled trees, windfalls, or of standing infested or dying trees. In the following interpretations, great dependence has been placed on the rearing records of which we have had intimate knowledge. For the most part dependence has been placed on records of the past five years. Older records have been interpreted according to the information that has been given in them. For the most part our interpretations of older records agree with the conclusions resulting from more recent work. Where such is not the case, there usually are definite indications that the information given in the older records is incomplete and could not be interpreted satisfactorily unless one had a personal knowledge of the conditions under which those records were taken.

M. drummondi has been reported to infest ponderosa and Jeffrey pine. Nine records of infestation of those hosts by drummondi are in the files. Pinned specimens under six of the nine collection numbers are M. californica. In all cases identification of the species collected was made before californica had been described as a new species.

Of the remaining three records: - One is listed under the wrong host species (Pseudotsuga). Another is a field identification that is questioned in the original note. No specimens could be found under that number. The third record is definite but no specimens could be found to check the identification (13,101xa). However, of three specimens under the same number (13,101ab) one is M. californica and two are M. intrusa. It is probable that all our records of M. drummondi attacking ponderosa or Jeffrey pine are based on faulty identifications. Only the records that could be checked by examination of pinned specimens have been included in this study.

Attraction:

Attraction to foliage: - Most of the specimens in the cabinets of many collectors are secured by beating foliage. But two notes in the

laboratory files record collection of adults of either species from foliage. One pertains to M. californica, the other to M. gentilis.

Attraction to slash or felled trees: - 12 records definitely note the attraction of M. gentilis to logs or slash. Four records of collection of M. californica from felled green or infested trees are in the files. Furniss (1930) noted that more adults of californica than of gentilis were attracted to line slash. It is apparent that both species are attracted. There seems to be some indication that seasonal factors may be at least partially responsible for the abundance or lack of abundance of either species on recently felled material.

Infestation:

Infestation of felled trees: - But one note records the rearing of californica from a young tree felled a year before the record was taken. Two definite recent notes record the emergence of gentilis from felled trees, no specimens of the other species being secured. All three records were concerned with ponderosa pine. Of several recent experiments in which both species were forced to attack logs, but one was successful. One adult of gentilis was recovered.

Infestation of windfalls: - Two recent rearing records note the emergence of gentilis from infested ponderosa pine windfalls. No recent notes record the emergence of the other species from windfalls.

Infestation of injured trees: - Burke's girdling of ponderosa pine trees resulted in infestation by M. gentilis. One note records development of gentilis brood in fire-injured Jeffrey pine. Three notes record californica in small trees injured by fire or some other agency.

Infestation of standing trees: - Infestation in this class of host material, which is that with which we are chiefly concerned in forest insect infestations in virgin or cutover stands, is predominantly that caused by M. californica. 29 definite notes record californica in ponderosa pine infestations, while thirteen more records pertain to Jeffrey pine infestations. It cannot be said that the nineteen records of gentilis in ponderosa pine, or the three of the same species in Jeffrey pine have the same character.

Four records in which gentilis has been recovered by rearing designate emergence of that species in small numbers, ~~was~~ Californica emerged in much larger numbers from the same samples. Other records note the emergence of gentilis from the atypical basal sections of the tree. More typical sections higher on the bole gave emergence of californica alone. In a few instances in which gentilis was recovered high on the bole, there was definite evidence of fill-in attacks following previous infestation by the other species. In at least two of the older records of gentilis, identification was by inference as there seems to be no evidence that adults were seen or secured.

Interpretation:

It is evident that both species are attracted to felled and injured hostmaterial. However, the preponderance of records in which gentilis is concerned in infestation of windfalls, felled logs or injured trees leads one to believe that that species is primarily concerned in such infestations. Much more work will have to be done before a definite appraisal of the role of each in that type of material will be possible. However, the emergence of gentilis in recent rearing records, and the absence of californica in the same records at least indicates the very minor role of the latter species in infestations of this type of host material.

It is also evident that both species infest standing and dying trees. However, the following facts lead to the conclusion that the gentilis infestation is incidental. In practically all records in which gentilis was secured, californica was secured in greater numbers. Gentilis came from bark from bole areas in which atypical infestations usually occur. Many similar rearings resulted in the emergences of californica alone.

Recent Work on the Characteristics of Flathead Infestations in dead and Dying Trees:

Some of the results of recent field work have been discussed above. However, a study of the characteristics of flathead infestation, the habits of flathead attack in standing trees and a determination of the species of flathead that is responsible for the different types of attack in infested trees also has been the goal of recent investigation.

Methods: - Basal examinations of infested trees usually reveal broods of the western pine beetle in ponderosa pine and broods of the Jeffrey pine beetle in Jeffrey pine. However, a basal examination usually does not reveal the true composition throughout the infested bole area of a given tree.

Examination of the entire bole area is necessary in determining the composition of an infestation in a given tree. The method we have used has been very similar to that employed by Tragardh (1927) to determine succession of attack by several species as well as to determine the area of surface infested by each species.

Over 1,500 felled infested trees have been examined during the past five years. The entire bole area is examined. The area infested by each species or specific combination of species is determined. Diameters are measured at the bottom and top of each type of infestation. The length of bole infested by each type also is measured. This information and notations concerning the brood stages present in each are mapped in diagrammatic form. Other information concerning the characteristics of attack and the host tree characteristics is noted on the same form.

Flathead infestations: - In general, it can be stated that flathead borers are primarily concerned in the topkilling of both ponderosa and Jeffrey pine trees. A typical diagram of that type of infestation is given

in Figure 1. Topkilling infestations may extend to a greater or less extent down the bole. Ordinarily the first attacks occur towards the top of a tree and supplementary attacks by flatheads or by other species of insects occur below the original flathead infestation. However, a few trees have been found in which the earlier attack or the fastest development seems to have occurred in the mid-bole region (fig. 2).

Infestation by a single generation of flatheads may be confined to the extreme upper portion of the main bole or may extend for some distance down the trunk. It has been found, possibly because of differences in the rapidity of development of associated species, that flathead infestations in Jeffrey pine usually extend farther down the trunk than those in ponderosa pine. The complete infestation of a tree by a single generation of flatheads is not uncommon (fig. 3). However, more often successive generations of flathead borers are concerned in the complete infestation (fig. 4). of a tree. Sometimes flatheads kill the phloem on but one side of a tree, usually confining their attacks to the southside. In spiral grained trees strip killed by flatheads, the strip may follow the grain and the infestation may circle the tree several times in the distance from base to top. (fig. 5).

Flathead infestations uncomplicated by the infestations of other species of insects are less common than those in which another or several other species enter the infestation. Usually such infestations follow flathead infestations in the top or bole (fig. 6). Sometimes the broods seem to have developed concurrently (fig. 7). However, in the tree represented by Figure 7, the flathead brood, having the slower development, evidently attacked before the other species. Similar concurrent development of broods of several species is involved in infestations in which flathead broods extend to the base (fig. 8). In such cases definite knowledge of life histories of the species concerned is necessary if a proper interpretation of the succession of attack is to be secured. In Figure 8 it has been considered that the flathead attack and infestation preceded that of other species.

Occasionally brood of a slowly developing species is found in the bark, whereas that of more rapidly developing species may have partially abandoned more recently infested areas.

Sometimes flatheads attack below previous topkilling by other species (fig. 9). That type of infestation was very common following the Ips outbreaks of 1930 and 1931 in westside type forests. Occasionally minor infestations in flatheads in small patches of green or injured phloem are found on infested trees. (fig. 10). This type of infestation is considered secondary. From what has been learned concerning the adults that emerge from this type of infestation, it is suspected that a different species of Melanophila is responsible for this type of infestation than is responsible for the more primary topkilling and bole infestations.

Habits of Attack: -

Type of attack: - Several types of infestations in which flathead borers enter into the composition have been described above. Roughly those types of infestation may be classified as topkilling or bole infestations. The distinction between the two types of infestation is not

always marked. Intergradations occur, in fact are abundant. Accordingly it has been decided arbitrarily that, if the flathead infestation extends below the midpoint of the bole, it is a bole infestation. Such infestations usually are simple extensions of top infestations.

Primariness of Attack: - The primary or secondary nature of an insect attack is still more difficult to define satisfactorily. Arbitrarily we have considered that the species first attacking the tree and whose infestation is active or spreading is a primary species. In making this distinction the element of time must be considered. Some infestations have been found in which flatheads infested tops after primary attacks had been made by other species in the midbole region (fig. 11). Such infestations have been considered secondary. Sometimes extremely old topkilling infestations by flatheads are followed, often some years later, by subsequent attacks by other species that result in the death of the tree (fig. 12). Although both Keen (1916) and Person (1928) have determined that topkilling makes trees much more susceptible to subsequent attacks by the western pine beetle, trees of the type just described often have not been considered to have suffered from primary topkilling flathead infestations. However, if flathead infestations below the much older topkilling initiated the lethal succession, then they are considered primary (fig. 13).

Infestations of a single season, or a succession of infestations by several species during a single season may not complete the sequence that is immediately responsible for the complete infestation of a tree. Thus, at a time an analysis is made it is possible to find, partially infested trees, particularly during seasons of suspended insect activity. (fig. 14). If the infestation was spreading up to the time activity was suspended, it usually is possible to determine the primary species involved in the succession.

It is evident from the above discussion and illustration of several of the important types of infestation composition that the problem of primariness is difficult to solve. All gradations occur.

The word primary is insufficient in describing the role of any one of the insect species concerned in the succession of attacks. The so-called primary species determined by the criteria of primariness given in this paper seem actually to be primary in the succession of entomological causes of death. However, there are many trees still living in which similar initial attacks have not resulted in death. Those trees are the stag-tops that are so abundant in many areas today. So far as is known there are relatively few trees that have survived the supplementary attacks of, let us say the western pine beetle, that have been the ultimate stage of the succession. However, what of the fact that in well over three fourths of all of the trees that have been examined the species immediately responsible for death merely followed previous attacks and was but the last step in a succession of events! That fact alone seems to justify the arbitrary stand and that has been set up in this study of the role of flathead borers in some recent forest insect infestations.

To follow the conception of primariness of causes of death back beyond entomological factors is necessary and logical. In some situations

it is probable that we cannot go back of the entomological factors as no other factors enter the picture. In other cases it seems evident that the non-entomological factors may be the important ones. It is difficult to know when to stop in ascribing the death of a tree or of trees to any given primary factor. Age and health of hosts, environmental factors, even heredity, are just a few of the many factors that may play a part in causing the death of trees. Those factors usually operate for some time preceding death. They are no less primary because of that. However, in the succession of entomological causes of death they appear to have an indirect influence. It seems reasonable to adhere to our definition of primariness if we limit it to the entomological factors.

Identity of the Species Concerned in Infestations of Standing Infested or Dying Trees:

We have attempted to point out that flathead infestations may, by application of an arbitrary standard, be considered either top or bole infestations. Similarly, by setting up an arbitrary definition of primary entomological causes of death, we have made it possible to divide both types of infestations into primary and secondary infestations. The species of Melanophila that are concerned in these four types of flathead infestations have been found to be as follows:

Primary topkilling: - Reliance in identifications of the species concerned in this type of injury is placed on thirteen recent and specific rearing records. In nine of those records ponderosa pine was the host tree. Three concerned infestations in Jeffrey pine. One recorded emergence from limbs of a topkilled ponderosa pine. In all thirteen records, californica was the only species of Melanophila that emerged from the infested material. Examination of other records of topkilled trees we believe justifies the following statement. M. californica is the species which is primarily responsible for the aggressive flathead attacks that result in the topkilling of ponderosa and Jeffrey pine trees in California.

Secondary topkilling: - No rearing records from this type of infested material are available for study. The closest approach to that type of infestation on which a record has been secured is one in which a second generation of flathead borers attacked weakly below a previous primary flathead topkilling infestation. The bole of the tree subsequently filled in with attacks by other species of insects. The species reared from bark taken from the weakly infested area was chiefly californica (13 specimens), but included a few gentilis (3 specimens).

Primary bole infestations: - Twenty-seven recent rearing records that list emergence from bark samples taken from ponderosa pine trees suffering from primary bole infestations gave the following results: - 396 adults of M. californica emerged from the material; 20 adults of M. gentilis were secured.

Six other records of emergence from infested Jeffrey pine bark list emergence of 202 adults of M. californica and 16 of the other species. Most of the older records note the emergence of californica from infestations that apparently are of this type. Few note the emergence of gentilis.

It is apparent that californica predominates in primary flathead infestations of both ponderosa and Jeffrey pine. From what is known of the conditions of infestation that resulted in the emergence of gentilis it is possible that californica is the only species actively concerned in primary flathead infestations.

The secondary nature of gentilis infestations in the records given above is indicated by the following observations. In three of the six rearings that resulted in the emergence of a few specimens of that species along with a larger number of californica adults, the bark samples from which they came were from basal portions of infested boles. The extreme base of infested trees (usually from the soil line to a height of 6 or 8 feet) often harbors fill-in or secondary types of infestation in previously uninfested patches of phloem or in sour sap areas. Often the primary species extends its attacks down to the base, but is less successful in the basal area. Under those conditions secondary attacks often fill in the incompletely infested phloem.

In two other records no observations were made as to the nature of the attack that resulted in the emergence of a small number of adults of gentilis along with a larger number of adults from californica. The other record of gentilis emergence was from bark taken from the midbole region of a previously topkilled tree. In that tree a second generation of flathead borers attacked rather weakly below a previous flathead attack. The bark from which the specimens emerged was taken at a point just below the older infestation.

Secondary bole infestation: - Four of the six records mentioned above, in which M. gentilis adults were secured by rearing, may be considered as secondary types of infestation. No other rearing records on secondary bole infestations are available for study.

Several records of attacks or emergence by gentilis from trees previously infested by other species or from trees damaged by fire or some other agency, point to the fact that gentilis is the species more actively concerned in infestations that follow critical injuries.

SUMMARY

In recent years flathead borer infestations have assumed a very important place in forest insect infestations in many forested areas in California. Analyses of the infestation composition of samples of recent forest insect infestations have revealed that flathead borers seem to play a primary role in the succession of infestations that usually is involved in the death of Jeffrey and ponderosa pines. Accordingly a study was made of all published and unpublished notes that were available for inspection. In addition, field studies were inaugurated to aid in solving the problems concerned with the importance, roles, and habits of the two species of Melanophila that were known to be involved in forest insect infestations of Jeffrey and ponderosa pine in California. The results of that work are as follows:

1. Published notes create the impression that Melanophila gentilis is the more active and important species. Californica has chiefly been considered to be of secondary importance.

2. Collection records at the Berkeley Laboratory indicate the following:

a. Both species are attracted to pine foliage.
b. Both species are attracted to slash and felled trees.
c. Gentilis appears to be the species chiefly concerned in infestations of felled trees and logs, windfalls, injured trees, and in secondary bole infestations in standing trees.
d. Californica seems to be the species chiefly concerned in infestations of standing trees, although attacks by that species also sometimes seem to be of secondary importance.

3. Flathead infestations in standing trees are variable as to type and extent of infestation. Consideration of those variations in attempts to classify types of flathead infestations have resulted in the following arbitrary definitions of flathead infestations.

a. Top infestations are those not extending below the midbole.
b. Bole infestations are those extending below the midpoint on the bole.

These two types of infestation are subdivided into primary and secondary types, a primary flathead infestation being considered one in which the flatheads were first in attacking the tree and in which their infestations are active or spreading. This classification seems reasonable when applied to entomological factors involved in the death of trees.

4. Primary topkilling has been found to be the work of californica.

5. Very little information has been secured concerning secondary topkilling infestations.

6. Primary bole infestations also appear to be the work of californica.

7. Both species seem to be involved in the few secondary bole infestations on which records have been taken.

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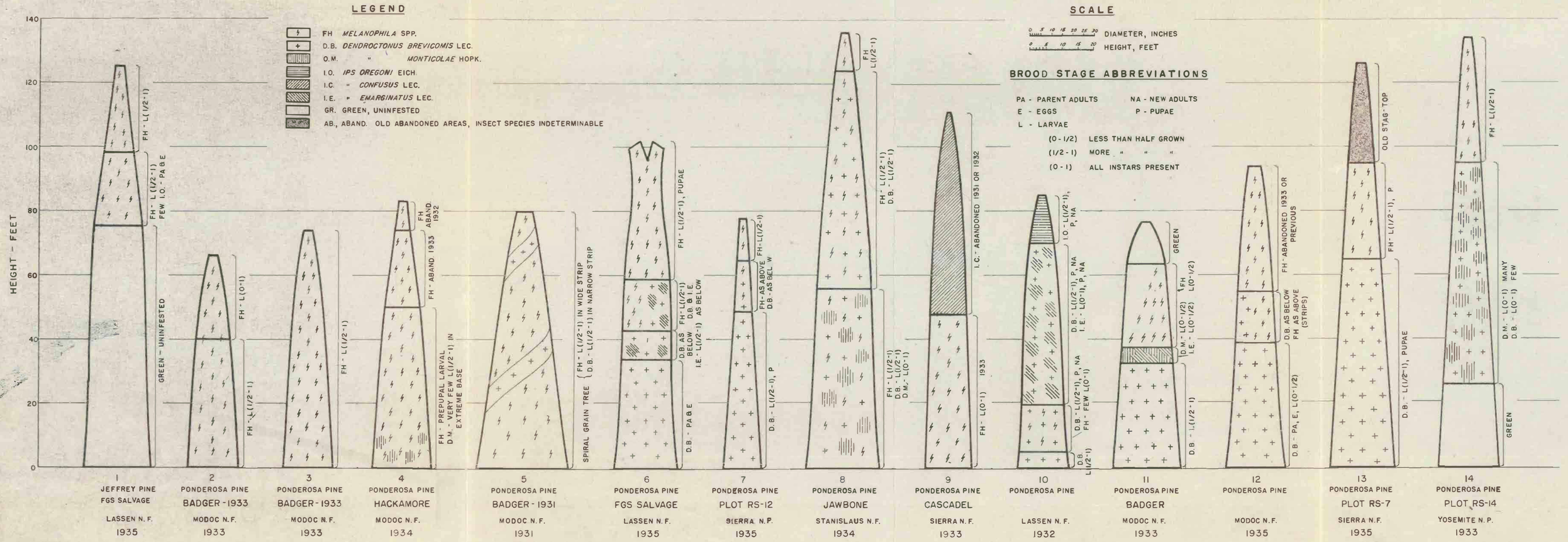
EXAMPLES OF FLATHEAD INFESTATION TYPES IN CALIFORNIA FOREST INSECT INFESTATIONS


LEGEND
FH MELANOPHILA SPP.
D.B. DENDROCTONUS BREVICOMIS LEC.
O.M. " MONTICOLAE HOPK.
I.O. IPS OREGONI EICH.
I.C. " CONFUSUS LEC.
I.E. " EMARGINATUS LEC.
GR. GREEN, UNINFESTED
AB., ABAND. OLD ABANDONED AREAS, INSECT SPECIES INDETERMINABLE
SCALE
DIAMETER, INCHES
HEIGHT, FEET
BROOD STAGE ABBREVIATIONS
PA - PARENT ADULTS
NA - NEW ADULTS
E - EGGS
P - PUPAE
L - LARVAE
(0-1/2) LESS THAN HALF GROWN
(1/2-1) MORE " " "
(0-1) ALL INSTARS PRESENT
HEIGHT - FEET
0
20
40
60
80
100
120
140
1 JEFFREY PINE FGS SALVAGE LASSEN N.F. 1935
2 PONDEROSA PINE BADGER-1933 MODOC N.F. 1933
3 PONDEROSA PINE BADGER-1933 MODOC N.F. 1933
4 PONDEROSA PINE HACKAMORE MODOC N.F. 1934
5 PONDEROSA PINE BADGER-1931 MODOC N.F. 1931
6 PONDEROSA PINE FGS SALVAGE LASSEN N.F. 1935
7 PONDEROSA PINE PLOT RS-12 SIERRA N.F. 1935
8 PONDEROSA PINE JAWBONE STANISLAUS N.F. 1934
9 PONDEROSA PINE CASCADEL SIERRA N.F. 1933
10 PONDEROSA PINE LASSEN N.F. 1932
11 PONDEROSA PINE BADGER MODOC N.F. 1933
12 PONDEROSA PINE MODOC N.F. 1935
13 PONDEROSA PINE PLOT RS-7 SIERRA N.F. 1935
14 PONDEROSA PINE PLOT RS-14 YOSEMITE N.P. 1933

COLLECTION NOTES IN THE FILES OF THE BERKELEY LABORATORY

Melanophila californica Van Dyke

Host: PONDEROSA PINE

Hopk. no. 4849a. Walker, Calif. 10/27/11. H. E. Burke, Colr.
a. Melanophila; small trees 2"-3" diameter killed by some agency. Seems to be cerambycids; butt or root mines. Melanophila exit holes in dead trees and large larvae in pupal cells in outer wood of dying trees. Specimens in collection are M. californica.

Hopk. no. 4862c. Glendenning's, Moffatt Creek, Calif. 11/9/11. H.E.Burke, Colr. Small tree 8" diameter with spike top, lower branches with brushy foliage; some twigs with greenish centers; bark dead and fairly loose; brood in lower trunk.
c. Small to medium larvae under bark of trunk. Specimens in collection are M. californica.

Hopk. no. 4884. Yreka, Calif. 2/10/12. H. E. Burke, Colr.
a. Several small dead trees 4 to 12' high; small to medium larvae fairly common under bark. May have killed trees or may have attacked when tree was dying. Char: Melanophila. Species in collection are M. californica.

Hopk. no. 4907. Yreka, Calif. 5/31/12. H. E. Burke, Colr.
a. Tree felled in control work in January 1912. Bark tight at that time; larvae, pupae and young adults fairly common in bark. Some exit holes. Char: M. drummondi. Note: Specimens in collection are M. californica.

Hopk. no. 4950. Placerville, Calif. 12/14/12. H. E. Burke, Colr.
a. Small tree about 30' high, 6" diameter. Foliage yellowish with some green. Most of bark dead and loose; full grown larvae common; curled up in pupal cells in bark. Char: M. drummondi. Specimens in collection are M. californica.

Hopk. no. 4956. Placerville, Calif. 1/28/13. H. E. Burke, Colr.
a. Large larvae in pupal cells in outer wood of red-top fire-injured tree about 6" diameter. Cells just beneath surface of wood. Mines riddle inner bark of main trunk; old healed-over mines buried ½" in wood. Adults reared. Char: M. drummondi. Specimens in collection are M. californica.

Hopk. no. 11761a. Placerville, Calif. 3/22/15. J.J. Sullivan, Colr. Melanophila adults, larvae, and pupae, from bark of small tree; foliage fading.

Hopk. no. 13072. Placerville, Calif. 3/24/15. H. E. Burke, Colr.
b. Prepupal larvae in cell in outer wood of young tree cut down about one year ago. Char: M. drummondi. Specimens in collection are M. californica.

Melanophila californica Van Dyke

Host: PONDEROSA PINE

Hopk. no. 13084. Bray, Calif. J. D. Riggs, Colr. 4/2/15.
a. 5 miles east of Bray; tree 16" diam. killed by this species; foliage red; pupae in pupal cells in bark. Few M. gentilis and many M. drummondi adults emerged. Checked by W. H. Lange in collection 3/11/35 as M. gentilis and many M. californica.

Hopk. no. 13101. Placerville, Calif. 11/9/14. F. B. Herbert, Colr.
a. Larvae under bark of 6" fire-scorched y.p.; needles fading. Char: M. intrusa. 1 specimen in collection is M. californica.

Hopk. no. 13193b2. Placerville, Calif. 3/18/15. F.B. Herbert, Colr.
a. Tree 20" diameter blown down within last 2 weeks, having broken off at old gall (Peridermium hartnesii) about 8" above ground. Needles still green. Prepupal larvae and pupae in pupal cells in outer bark of 8" basal section. Char: Melanophila n.sp. Specimens in collection are M. californica.

Hopk. no. 13799a. Placerville, Calif. 4/20/16. F. B. Herbert, Colr.
2 dead trees 10" diam. foliage faded, bark loose, prepupal larvae and pupae in bark of lower trunk: Ips may be in top. Record shows adults transformed and were M. californica.

Hopk. no. 16278c. Pinehurst, Ore. 7/10/28. J. E. Patterson, Colr.
Insects collected from logs on logging area. No evidence of attack and brood development. Single specimen in collection is M. californica. Gentilis also taken at same time.

Hopk. no. 17052a. Northfork, Calif. 6/20/27. G. R. Struble, Colr.
Very small buprestids emerged from bark in rearing cage.

Hopk. no. 17981a. Willow Ranch, Calif. 7/6/29. G. R. Struble, Colr.
Small buprestid in pupal cell in outer bark prior to emergence.

Hopk. no. 18222b. Madrone, Calif. (Pine Ridge, Mt. Hamilton Range). 4/29/30. A. Wagner, Colr.
26" tree killed by this species; pupae, new adults.

Hopk. no. 18370gh. Hackamore, Modoc N.F. Calif. 7/--/30. R.L.Furniss, Colr.
g. 7/8/30, 7/9/30, 4 taken; numerous, especially around tops, also on top sides of logs in bright sunshine.
h. Buprestidae. 6/30-7/10-7/11/30. 3 taken ovipositing on tops of slash logs, especially near small ends.

Hopk. no. 18372w. Hackamore, Modoc N.F., Calif. 7/7-11/30. Person's crew, Colrs.
Adult collected from rearing material used in Person's "Biological control" project; the species were taken at random from the various cans, etc.. . . . . Bark from 12 summer trees was caged.

Melanophila californica Van Dyke

Host: PONDEROSA PINE

Hopk. no. 18385. Devil's Garden, Modoc N.F., Calif. 7/7 /31. J.M.Miller, Colr. M. californica recovered from three of four rearing cans containing infested bark from four different overwintering 1930 brood trees.

Hopk. no. 18391c. Northfork, Calif. 10/15/31. J. M. Miller, Colr. Tree 24" D.B.H. with fading top - green base, typical of many top-killed trees in Cascadel area.
c. Melanophila californica prepupal larvae. Upper 30' of crown infested. This species seems to have caused primary topkilling. Some prepupal larvae found in outer bark. Others in sapwood. Adult specimens seen in collection.

Hopk. no. 19273d. Timber Mtn., Modoc N. F. Calif. 7/10/30.K.A.Salman, Colr. Adult on bark of insect-killed ponderosa pine.

Hopk. no. 19276h. Flag Springs, Modoc N.F., Calif. 7/8/30. K.A.Salman, Colr. M. californica adults from pupal cells in bark of western yellow pine.

Hopk. no. 20828b. Devil's Garden, Modoc N.F., Calif. 5/12/31. K.A.Salman, Colr. Insects collected on or under bark; trees mostly killed by barkbeetles

Hopk. no. 20989. Aspen Valley, Yosemite N.P., Calif. 3/5/34. K.A.Salman, Colr. Small 16" tree infested with last winters broods. Top red, infested by D.b. and Ips emarginatus. Prepupal flatheads in tree. Bark placed in rearing by R. L. Furniss. Adults of M. californica secured.

Hopk. no. 20996. Lassen N. F., Calif. 6/15/34. K. A. Salman, Colr. Small tree showing flathead work in trunk. Larvae work in bark, sometimes scoring outer sapwood. Infestation moderately heavy. Specimens taken for dehydration and rearing. 5 adults M. californica secured.

Hopk. no. 21027. Bass Lake, Calif. 5/1/35. G. R. Struble, Colr. Flathead rearing studies. Small standing tree, second growth, killed by F.H. 10" D.B.H. 40' high. Felled parts placed in rearing.
1a. Bark from basal 10' - 73 M. californica adults emerged.
1b. Top part of trunk (No emergence noted in record)(My note)
1c. Branches (No emergence noted in record)(My note)

Hopk. no. 21132. Northfork, Calif. 12/5/33. G. R. Struble, Colr. Ponderosa pine bark infested by Melanophila. Brought to Laboratory for freezing tests. A quantity of bark placed in rearing to determine the species. Adults of M. californica secured.

Hopk. no. 21137. Aspen Valley, Yosemite N.P., Calif. K.A.Salman, Colr. Apparently this number and record duplicates Hopk. no. 20989, given above. It is from the same tree. M. californica emerged.

Melanophila californica Van Dyke

Host: PONDEROSA PINE

Hopk. no. 21174. Hackamore, Calif. May-July, 1934. J.W.Bongberg, Colr. Results of M. californica emergence during the summer of 1934. Results taken from 3 tree cages and from bark in six cans from as many flathead trees. Total 577 adults M. californica. (Note - no gentilis - KAS)

Hopk. no. 21180. Stanislaus N.F.,(Jawbone), Calif. 4/4/35. W.H.Lange, Colr. Bark of ponderosa pine, collected from mid-bole containing prepupal Melanophila larvae. Infested tree #526-----Bark placed in rearing at Berkeley for emergence records. M. californica emerged.

* Hopk. no. 21182j. Institute of Plant Genetics, Placerville, Calif. 5/3/35. W. H. Lange, Colr.
M. californica adult collected on foliage. *oooooooooooooooooooooo-ooooooooooooooooooooooooooooooooooooooo

Hopk. no. 21195. Hackamore,Calif. (Modoc N.F.) 4/23/35. Salman and Johnson, Colrs.
a-d. FH infested bark taken from tree killed by mixed broods (FH-Db) Infested bark sample taken from 29" to 32' on main trunk. M. californica alone emerged.
c. Infested FH bark from 39'to 41' up main trunk. M. californica alone emerged.

Hopk. no. 21196. Squaw Valley, Calif. Lassen N. F. 6/6/35. W.H.Lange, Colr. FH infested tree. Top 23' killed by FH. 78' green. Infested bark from 80' up main trunk collected and placed in rearing at Hackamore. 9 adults M. californica emerged.

Hopk. no. 21198. Squaw Valley, Calif. Lassen N.F. 6/35. K. A. Salman, Colr. Infested tree located near F.G.S. Camp #10. Mixed infestation of D.b. and FH. Infested FH bark taken at 65' up main bole.

Hopk. no. 21266. Hackamore, Calif. Modoc N.F. 5/28/35. Salman and Bongberg, Colrs.
FH. topkilled tree with basal part of trunk filled in with D.b. 36"DBH, 6 logs. FH infested bark from 62' to 72' on main trunk placed in rearing. 13 M. californica, 3 M. gentilis emerged.

Hopk. no.21268. Hackamore, Modoc N.F., Calif. 7/17/35. Bongberg, Colr. Tree infested by D. monticolae, and FH broods.
a. FH bark from base of tree placed in rearing. M. californica emerged.
b. Bark from 20' to 50' up main trunk placed in rearing. M. californica emerged.

Hopk. no. 21270. Hackamore, Modoc N.F., Calif. 6/4/35. Bongberg and Yuill, Colrs.
Small ponderosa pine killed by FH. Tree felled and infested bark from 18' to 32' up main trunk placed in rearing. M. californica emerged (74).

Melanophila californica Van Dyke

Host: PONDEROSA PINE

Hopk. no. 21272. Hackamore, Calif. Modoc N.F. 6/3/35. Johnson and Yuill, Colrs.
a. Topkilled ponderosa pine. Tree felled and infested bark from 60' to 65' up main trunk placed in rearing. 42 M. californica adults emerged.
b. Infested bark from 55' to 60' placed in rearing. 50 M. californica adults emerged.

Hopk. no. 21273. White Horse, Modoc N.F., Calif. 5/29/35. K.A.Salman, Colr.
a. Small ponderosa pine in McCloud Salvage area infested with FH. Basal 6½ feet placed in rearing. 38 M. californica and 3 M. gentilis emerged.
b. Terminal portion 6½ to 13' placed in rearing. 1 M. californica emerged.

Hopk. no. 21274. Hackamore, Calif. Modoc N.F. 6/5/35. J.W. Bongberg, Colr. Topkilled ponderosa pine with FH infestation extending down main bole. Bark from 32' to 36', 36' to 42', 46' to 54', and 53' to 61', placed separately in rearing. M. californica only Melanophila to emerge.

Hopk. no. 21275. Squaw Valley, Lassen N.F., Calif. 6/12/35. K.A.Salman, Colr. Infested ponderosa pine from F.G.S. salvage area. Bark from 52' to 74' up main trunk placed in rearing at Hackamore. 17 M. californica adults emerged.

Hopk. no. 21277. Hackamore, Modoc N.F., Calif. 5/24/35. Salman, Johnson, Colrs.
a. FH infested tree. Progressively killed from top to bottom during three year period. Infested bark from 40' up main trunk placed in rearing. 28 M. californica secured.
b. Bark from 20' up main trunk placed in rearing. M. californica alone secured. Bark from base, 5 M. gentilis, and 1. M. californica.

Hopk. no. 31901h. Yosemite N.P., Calif. 5/21/36. G. R. Struble, Colr. Infested tree felled, north side of Merced River near El Capitan. Basal 60' heavily infested with D.b. new att. and eggs. Above 60' apparently heavy attack of Pityophthorus, aggressive and apparently primary with brood fully grown. Larvae and pupae in main stem and in limbs. Few Ips confusus att; put top of this tree and few limbs in rearing. 1 M. californica adult secured along with other species.

* Hopk. no. 31907. Bass Lake, Calif. 6/23/36. Struble and Yuill, Colrs. Small 8" tree near recreation center faded sorrel. Tree cut and foudn to be infested by FH along main stem to top. This cut into small lengths and placed in rearing can at 8-Mile, Yosemite N.P. No M. californica or any other emerged. Still in rearing.

Melanophila californica Van Dyke

Host: PONDEROSA PINE

Hopk. no. 31908. Yosemite N.P., Calif. 6/24/36. G. R. Struble, Colr. Large 50" tree felled ½ mile south of 8-Mile. Heavy D.b. work and infestation along entire length except top 20'. Scattered FH work in top 20'. Old FH scars evident which have healed. Ips confusus predominant in top 20' and limbs, some D.m. pupae and NA. Placed FH bark in rearing. 2 Melanophila californica adults collected.

This series of notes takes all on M. californica in ponderosa pine that are in the Hopkins Record books at Berkeley, California, to January 1, 1937. All 1936 work at the Hackamore laboratory has not yet been recorded.

Host: JEFFREY PINE

Hopk. no. 14469. Meyers, Calif. 7/20/16. F. B. Herbert, Colr.
a. Feeding and prepupal larvae, pupae and live and dead adults in and under bark of 20" tree dead with char: M. drummondi. Specimens in collection are M. californica.

Hopk. no. 16092. Swarthout Valley, Calif. 9/23/23. H. E. Burke, Colr.
a. Melanophila gentilis; large larvae in pupal cells in bark; appear to have killed tree, which has red foliage; adults of this or another species have emerged. Reared.
Note: Adults in collection checked as M. californica.

Hopk. no. 16648. Arrowhead, San Bernardino Co.,Calif.4/20/22/ R.D. Hartman, Colr.
b. M. californica adult fragments from cells of bark.

Hopk. no. 16837. Swarthout Valley, Los Angeles Co. Park., Calif. 6/29/25. J.M.Miller, Colr.
A 34" tree with fading foliage.
a. Melanophila sp. pupae and new adults in outer bark. This species is one that appears to be primary in the killing of slow-growing Jeffrey pine in the park. M. californica det. Fisher.

Hopk. no. 17949. Corte Madera Rch., Descanso, Calif.3/13/30. J.M.Miller, Colr.
a. Buprestidae; larvae in prepupal cells in outer bark (base) Char: M. californica. No adults could be found in collection. No evidence of adults having been reared.

Hopk. no. 20714. Wrightwood, Calif. Big Pine Park.5/20/31. K.L.Wolff, Colr. Small tree 2" diameter; dead; section of trunk shows no work except that of Melanophila californica. Some beetles have emerged; young adults in pupal cells in outer wood just ready to emerge.

Melanophila californica Van Dyke

Host: JEFFREY PINE

Hopk. no. 21802. Lassen N.F., Calif. Lasco Thinning Area. 5/17/34.
K. A. Salman, Colr.
Infested reproduction and poles collected and brought in to Berkeley for rearing. Can #2 as follows: Pole over 6'; last year's work placed in this can. Cylindrocopturus present and perhaps others. 1 M. californica adult secured.

Hopk. no. 21194. Squaw Valley, Calif. Lassen N.F. 6/4/35. K.A.Salman, Colr. Bark from FH killed tree, Lassen N.F., near F.G.S. Camp #10. 26" DBH, 4 logs. Bark from 50' up main trunk. Infested bark placed in rearing 6/8/35 at Hackamore, Calif. 14 adults, M.californica emerged.

Hopk. no. 21197. Squaw Valley, Calif. Lassen N.F. 6/3/35. K.A.Salman, Colr. FH infested tree. Top 27' infested with pure FH brood. Lower 37' mixed FH and DJ broods. Tree located near F.G.S. Camp #10. Infested bark from base of main trunk placed in rearing.
a. Bark from base of tree, 5 M.californica and 15 M.gentilis adults.
b. Bark from 37' up main trunk, 12 M. californica.

Hopk. no. 21199. Squaw Valley, Calif. Lassen N.F. 6/4/35. W. H. Lange, Colr. FH infested tree near F.G.S. Camp #10. 30" DBH, 5 logs, Class 3. Infested bark from 36 to 68' up main trunk placed in rearing. 18 M. californica adults emerged.

Hopk. no. 21267. Squaw Valley, Calif. Lassen N.F. 6/12/35. K.A. Salman, Colr. Infested Jeffrey pine located near F. G. S. Camp #10. Infested FH bark from 76' to 90' on main trunk placed in rearing. 47 M.californica emerged.

Hopk. no. 21271. Squaw Valley, Calif. Lassen N.F. 6/11/35. K.A.Salman, Colr.
a. FH infested Jeffrey pine taken in F.G. Salvage Area. Infested bark from 10' to 64' placed in rearing. 81 M. californica and one M. gentilis emerged.
b. Bark from midbole placed in cage. 39 M. californica emerged.

Hopk. no. 21276. Squaw Valley, Calif. Lassen N.F. 6/21/35. W. H. Lange, Colr. Infested Jeffrey pine from F. G. S. salvage area. Infested bark from 62' to 85' up main bole placed in rearing. 13 M. californica adults emerged.

Hopk. no. 21278. Squaw Valley, Lassen N.F., Calif. 6/19/35. W.H.Lange, Colr. Infested Jeffrey pine located in F.G.S. Salvage Area. Tree killed entirely by FH. Infested bark from 45' to 54' placed in rearing. 17 M. californica adults emerged.

Records from Record Book at Berkeley, California complete through #32111 and to January 1, 1937. Perhaps other 1936 records yet to be entered.

Melanophila gentilis Leconte

Host: PONDEROSA PINE

Hopk. no. 165e. Keen's series. Ashland, Ore. 5/3/16. F. P. Keen, Colr.
e. Melanophila gentilis from tree killed by flatheads.
f. Melanophila (drummondi?) from same tree.
Note: A possible record. No specimens to examine in our collection. Perhaps 165f was M. californica.

Hopk. no. 4887a. Yreka, Calif. 2/14/12. H. E. Burke, Colr.
a. Large tree with yellowish lower limbs and greenish upper; bark at base rather dead, at top greenish; large larvae in pupal cells in bark at butt; small larvae under bark of top; no beetle work; badly burned years ago at butt. Note: Identification evidently made on larvae. No adults found in collections under this number.

Hopk. no. 4943a. Yreka, Calif. 8/29/12. H. E. Burke, Colr.
Adult on foliage of healthy young pine; needles chewed along their edges; may be the work of this species - Melanophila gentilis.

Hopk. no. 4984b. Placerville, Calif. 6/7/13. H.E. Burke, Colr.
6/7/13. Female on freshly cut wood. Same on 6/23/13. Note: No evidence of brood development.

Hopk. no. 10883. Ashland, Oregon. 2/7/14. J. M. Miller, Colr.
Observations and collections.
c. Coleoptera, Buprestidae, Larvae feed in the cambium. Full grown larvae and new adults in cells in outer bark. Char: M. gentilis.
Note: No adults found in the station collections.

Hopk. no. 11731. Whitehall, Calif. 5/7/14. J. J. Sullivan, Colr.
Buprestid, pupae and young adults in outer bark of dying tree affected by western pine beetle. Char: Melanophila gentilis. Note: Adults found under this number in station collection are M. gentilis.

Hopk. no. 12706. El Paso Co., Colorado. 1/14/14. G. Hofer, Colr.
a. Tree 14" diameter, red foliage; infested by flathead borers, large larvae, first adult was taken from wood of this tree 3/27. 2 adults emerged from rearing material at station 3/29. Elevation of area on which tree is located 7000'. It will be some weeks yet before adults at this elevation will emerge. Char: M. gentilis. Note: No adults of this number found in station collection.

Hopk. no. 12729. Larkspur, Colorado. 5/17/14. G. Hofer, Colr.
a. Taken in act of emerging from y.p. windfall; large number of adults had emerged in past few days; only few pupae found; adults numerous; 2 adults, each in small bottle, sent Dr. Burke 5/21/14. Char: M. gentilis: Note: Adults in collection are M. gentilis.

Hopk. no. 12746. Larkspur, Colorado. 6/2/14. B. T. Harvey, Colr.
a. Larvae in bark of dead tree; adults and pupae plentiful; see specimens sent. Shar: M. gentilis. Note: Specimens in collection are gentilis.

Melanophila gentilis Leconte

Host: PONDEROSA PINE

Hopk. no. 12753c. Placerville, Calif. 5/27/14. H. E. Burke, Colr.
c. Tree girdled 5/27/14. hacked; M. attack mostly above girdle; small mines and small larvae, seem drowned by juicy bark; attack this summer.

Hopk. no. 12754. Placerville, Calif. 5/27/14. H. E. Burke, Colr.
a3. Bark dead but tight, foliage red; attack above girdle; winding mines under bark, small to large larvae in mines. Char: M. gentilis.
Note: No adults found under this number in collection. Does not appear that rearings continued to adult stage.

Hopk. no. 12755. Placerville, Calif. 5/27/14. H. E. Burke, Colr.
Several trees girdled and hacked. under a1, a2, a3, a4, a5, a6. Melanophila larvae, prepupae, and pupae listed with several specimens of adults under those numbers found in station collection. All are M. gentilis.

Hopk. no. 12775b. Placerville, Calif. 8/8/14. H. E. Burke, Colr.
b. Number of trees cut down in June; tops dead and red; bark dead with some greenish spots; large larvae, mostly in prepupal stage; in cells in bark; transf. to adult 7/1/15. Char: M. gentilis.
Note: Specimen in collection is that species.

Hopk. no. 13061. Garden of the Gods, Colo. 3/12/15. G. Hofer, Colr.
a. 1 larva from sapwood of dead limb, alive in small bottle. Section of wood containing 1 larva, from same limb. Char: M. gentilis.
Note: Adults apparently not secured.

Hopk. no. 13078. Ute Pass, Colorado. 3/27/15. G. Hofer, Colr.
a. 5 prepupal larvae from bark of Dendroctonus-infested tree; alive in bottles. Char: M. gentilis.
b. 1 larvae from bark of same tree; alive in small bottle. Char: M. gentilis. No adults seen in collection. Apparently not reared.

Hopk. no. 13084. Bray, Calif. 4/2/15. J. D. Riggs, Colr.
See under M. californica.

Hopk. no. 13504. Placerville, Calif. 4/3/15. F. B. Herbert, Colr.
a. Pupae and adults in pupal cells in middle layers of bark of y.p. 6" diam., dead several months; no emergence holes yet. Char: Melanophila n.sp. (most of them)(2 specimens sent Fisher). Char: M. gentilis.
Note: No specimens in collection; possible refers to M. californica which was not described at the time the record was taken.

Hopk. no. 13586. Placerville, Calif. 10/27/15. F. B. Herbert, Colr.
e. Melanophila prepupal larva in pupal cell in bark; 2 adults in L.G. coll. 3/24/17. Char: M. gentilis. Note: No adults under this number were found in collection.

Melanophila gentilis Leconte

Host: PONDEROSA PINE

Hopk. no. 13794. Flagstaff, Ariz. 6/10/15. A. J. Jaenicke, Colr.
a. Cutting area 22 miles SE of Flagstaff; found in considerable numbers running over logs, slash, etc.; breeds only in stumps, logs, and larger slash so far as observed; larvae usually abundant in stuff cut 2 years.

Hopk. no. 14426. Placerville, Calif. 3/2/16. F. B. Herbert, Colr.
b. Prepupal larvae in pupal cells in bark; secondary to D.b. 3/22/16. Found pupa in bark but ruined it.
b_1. 4/15/16. Found 1 adult and 1 pupa in bark, but cut pupa. All seem to have emerged. Char: Melanophila. Det: M. gentilis

Hopk. no. 14445. Camino, Calif. 5/26/16. F. B. Herbert, Colr.
Large 40" tree dead for year or so. Foliage mostly fallen. Sour sap under bark with many large and small maggots.
b. Prepupal larvae in pupal cell in bark; 1 adult in L.G. collection 3/24/17. Char: Melanophila gentilis.

Hopk. no. 15709. Yosemite Valley, Calif. 7/2/18. J. E. Patterson, Colr.
Trap tree obtained by leaving about 30' of green uninfested bark on base of trunk.of D.b. killed tree cut in control during April. Tree #7. Area C. Unit 4A.
c. Coleoptera, Buprestidae. Larvae feed under bark on inner layers and decaying and green cambium.7/2/18. Parent adults attacking tree from stump up. Det: M. gentilis. Burke Id.

Hopk. no. 16069. Big Spring, R.S., Arizona. 5/25/22. G. Hofer, Colr.
a. Prepupal larvae from heartwood of sapling 2" diam., which died in 1921; evidence of fungus on roots. Note: This record seems queer.

Hopk. no. 16278. Pinehurst, Oregon. 7/10-20/28. J. E. Patterson, Colr.
See under M. californica - same Hopk. no.

Hopk. no. 16459. Cow Creek, Calif. 5/22/24. Slash plot 1, down hill, H. E. Burke, Colr.
a. Tree 36" diam. blown down last fall. Adults flying and crawling on main trunk. Char: M. gentilis. Note: No evidence of brood development.

Hopk. no. 16895. Happy Camp, Modoc N.F., Calif. 9/-/26. F.P.Keen, Colr.
Insects collected from numbers of different trees for photographic purposes. Yellow pines infested with D.b. and other beetles.
d. Melanophila gentilis Lec. larvae in bark of dying trees. Note: - Larval identification.

Hopk. no. 17048. Northfork, Calif. 6/6/27. DeLeon & Person, Colrs.
b. One small green Buprestid on log of J202. Det: M. gentilis Burke. Note: No evidence of attack or development.

Melanophila gentilis Leconte

Host: PONDEROSA PINE

Hopk. no. 17931. Paradise Creek Canyon, Sequoia N.P., Calif. 10/14/29.
J. M. Miller, Colr.
Trees ext. down into canyons below main timber belt began dying conspicuously about 1927-28. Near jct of Middle Fork and Paradise Creek found flathead work prevalent in dead trees.
a. Inf. ext. from 20' above base to top: ½ grown larvae. Char: M. gentilis.
Note: Larval identification.

Hopk. no. 17937. Buck Creek R.S., Modoc N.F., Calif. 10/20/29. A.Wagner, Colr.
Fandango Cr. fire in July, 1929. Cerambycids and FH borers attack fire killed trees soon after fire; sections from inf. trees taken for rearing.
b. Buprestid prepupal larvae in sapwood.
b1. M. consputa - O.K. 3/11/35.det. Lange.
b2. M. acuminata ? - W.H.Lange.
b3. M. gentilis O.K. 3/11/35. W.H.Lange.

Hopk. no. 17095. Buck Creek R.S., Modoc N.F., Calif. 6/25/28. G.R.Struble, Colr.
Buprestidae attracted to newly-felled-freshly attacked D.b. tree.
a. Det. M. gentilis
Note: No evidence of brood development.

Hopk. no. 17966. Willow Ranch, Calif. 8/13/28. G. R. Struble, Colr.
Mat. attracted to turpentine cup on SW face of tree #18. This tree att. and killed by D.b. and had heavy D.valens brood in base.
m. Buprestid. Det: M. gentilis
Note: No development.

Hopk. no. 18056. Mirror Lake Trail, Yosemite N.P., Calif. 7/6/28.
H. E. Burke, Colr.
Young y.p. 2" diam. foliage red, bark dead and loose at base, while fungus underneath inner bark riddled with mines of M. gentilis. Emergence holes dead beatles; several prepupal larvae curled up in pupal cells of outer bark. Several pupae in pupal cells.
a. M. gentilis

Hopk. no. 18385. Devil's Garden, Modoc N.F.,Calif. 7/31/31.
See under M. californica

Hopk. no. 19231. Mariposa Grove, Yosemite N.P., Calif. 6/17/32.
R. L. Furniss, Colr.
Coll. in pitch on stump of treated sugar pine.
a. M. gentilis
Note: Significant only of attraction to stump.

Hopk. no. 19223. Bass Laek, Calif. 6/32/ R. L. Furniss, Colr.
Misc. coll. during June around Bass Lake.
g. M. gentilis
Note: No relation shown to infestations.

Melanophila gentilis Leconte

Host: PONDEROSA PINE

Hopk. no. 19276. Hackamore, Modoc N.F.,Calif. 7/19/30. K.A.Salman, Colr.
Adults taken from freshly felled logs in sun at various dates.
e. M. gentilis 6/14/30
Note: Attraction only to logs shown.

Hopk. no. 20824. Hackamore, Modoc N.F.,Calif. 6/10/31. K.A.Salman, Colr.
Running about on logs felled spring 1930 in road construction.
e. M. gentilis
Note: Attraction only to logs shown.

Hopk. no. 21026. Bass Lake, Calif. 4/12/35. G. R. Struble, Colr.
Flathead rearing studies. Large windfall 40" D.B.H. Parts of tree placed in rearing cages. M. gentilis pupa and adults abundant.
a. Bark from basal trunk 2" thick - 16 M. gentilis adults
b. Bark from top ½" thick - 1 M. gentilis adult
c. Bark from limbs - 6 M. gentilis adults.

Hopk. no. 21078. Black Fox Thinning Project, Shasta N. F., Calif. 5/10/34. K. A. Salman, Colr.
Numerous species collected on felled poles.
b. M. gentilis on P. ponderosa, Libocedrus decurrens, and Abies concolor.
Note: No infestations shown by record.

Hopk. no. 21266. Hackamore, Modoc N.F., Calif. 5/28/35. K. A. Salman and J. W. Bongberg, Colrs.
See under M. Californica.

Hopk. no. 21269. Hackamore, Modoc N.F., Calif. 6/8/35. K. A. Salman, Colr.
Small green tree felled in clearing right of way in 1934. After tree was felled it filled in with FH and I.oregoni. Bark placed in rearing. 8 M. gentilis emerged.

Hopk. no. 21273. Whitehorse, Calif. Modoc N.F. 5/29/35. K. A. Salman, Colr.
See under M. californica.

Hopk. no. 21277. Hackamore, Calif. Modoc N.F. 5/24/35. K. A. Salman and P. C. Johnson, Colrs.
See under M. californica.

Hopk. no. 21279. Hackamore, Calif. Modoc N.F. 6/22/35. J. W. Bongberg, Colr.
Green log forced attack by M. gentilis adults. One year after forcing 1 M. gentilis adult r emoved from pupal cell in bark.

Host: JEFFREY PINE

Hopk. no. 11772a. Illilouette, Yosemite N.P., Calif.6/30/15. J.J.Sullivan, Colr.
Melanophila adult and pupae in outer bark of tree infested by Jeffrey pine beetle. Char: M. gentilis.

Melanophila gentilis Leconte

Host: JEFFREY PINE

Hopk. no. 17819c. Floreston, Calif. 5/26/27. J. M. Miller, Colr.
A group of trees in area burned over in fire of July, 1926.
c. New adults, pupae in outer bark of small fire scorched tree. Some emergence. Seems to have taken place. M. gentilis.

Hopk. no. 21197. Squaw Valley, Lassen N.F., Calif. 6/3/35. K.A.Salman, Colr.
See under M. californica.

Hopk. no 21271. Squaw Valley, Lassen N. F., Calif. 6/11/35. K.A.Salman, Colr.
See under M. Californica.